Title	***New Front End for SCSPX Beamline***			
Project Requestor	Yifei Jaski			
Date	03/21/2008			
Group Leader(s)	Patric Den Hartog			
Machine or Sector Manager	Efim Gluskin			
Category	Accelerator hardware and Insertion Device Upgrades			
Content ID*	APS_1254433	Rev.	2	3/21/08 3:17 PM

*This row is filled in automatically on check in to ICMS. See Note [1]

Description:

Start Year (FY)	**2009**	**Duration (Yr)**	**3**

Objectives:

Design, fabricate and install a new front end for the Superconducting Short Pulse X-ray (SCSPX) beamline. A new front end with a much larger vertical aperture than the traditional front end is required in order to pass the SCSPX beam.

Benefit:

The new front end with a much larger vertical exit aperture will pass the full SCSPX beam to be optically compressed at the beamline to deliver the desired intensity to the experimental sample. The new front end is essential for passing a full SPX beam and allowing APS to conduct SPX experiment.

Risks of Project: See Note [2]

The risks for the construction of a new Front End are well known, as the APS has built and operated more than 50 Front Ends. No additional or new hazards are anticipated.

Consequences of Not Doing Project: See Note [3]

The full SPX beam can not be delivered because the existing front end has a vertical exit aperture of 4.5 mm which is not sufficient to pass the SPX beam. Only a small portion of the SPX beam will pass the existing front end and the beam flux is not sufficient for the SPX experiment.

Cost/Benefit Analysis: See Note [4]

It has been determined that most components such as shutters and masks of the new SCSPX front end can be designed by modifying the existing HHL type front end components. The modification is straight forward. The costs of these components are well known. The only components that require R&D are the XBPMs and Be window, if needed.

Description:

The SPX beam created by a superconducting cavity has a very large vertical beam size. The front end vertical exit aperture needs to be at about 30 mm in order to allow a sufficient amount of beam to pass. All the existing front ends have a vertical aperture of 4.5 mm or less. The new front end is required to be compatible with a SCSPX beam with large beam foot print and low power density and, for when the SC cavity is off, a normal undulator beam with small beam foot print and a high power density. Technical challenges on the masks and shutters design were studied and solved. R&D is necessary for the XBPM design and for the Be window design.

Funding Details

Cost: ($K)
Use FY08 dollars.

Year	AIP	Contingency
1	100	
2	450	
3	135	
4		
5		
6		
7		
8		
9		
Total	685	10%

Contingency may be in dollars or percent. Enter figure for total project contingency.

Effort: (FTE)
The effort portion need not be filled out in detail by March 28

Year	Mechanical Engineer	Electrical Engineer	Physicist	Software Engineer	Tech	Designer	Post Doc	Total
1	1.5		0.25			1		2.75
2	1.5					1		2.5
3	1	0.25		0.25	1	0.5		3
4								0
5								0
6								0
7								0
8								0
9								0

Notes:

[1] **ICMS**. Check in first revision to ICMS as a *New Check In*. Subsequent revisions should be checked in as revisions to that document i.e. C*heck Out* the previous version and C*heck In* the new version. Be sure to complete the *Document Date* field on the check in screen.

[2] **Risk Assessment.** Advise of the potential impact to the facility or operations that may result as a consequence of performing the proposed activity. Example: If the proposed project is undertaken then other systems impacted by the work
include ... (If no assessment is appropriate then enter NA.)

[3] **Consequence Assessment.** Advise of the potential consequences to the facility or to operations if the proposal is not executed. Example: If the proposed project is not undertaken then ____ may happen to the facility. (If no assessment is appropriate then enter NA.)

[4] **Cost Benefit Analysis.** Describe cost efficiencies or value of the risk mitigated by the expenditure. Example: Failure to complete this maintenance project will result in increased total costs to the APS for emergency repairs and this investment of ___ will also result in improved reliability of ____. (If no assessment is appropriate then enter NA.)